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22 October 1981

Japan Report

(FOUO 60/81)



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JAPAN REPORT

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CONTENTS

POLITICAL AND SOCIOLOGICAL

NATIONAL CONSTITUENCY SYSTEM FOR HOUSE OF COUNCILLORS CONSIDERED UNLIKELY

Media's Pessimistic View

Tokyo NIHON KEIZAI SHIMBUN in Japanese 15 Sep 81 p 1

[Text] "Is the Liberal Democratic Party really going to push through a national constituency system for the Upper House at the Special Session of the Diet?"

"Our task is merely to compile a responsive proportionate representation plan and the rest is up to the Upper House Liberal-Democrats."

This was the exchange between Komeito Party's Election Policy Committee Chairman Ohno, trying to worm out the Liberal-Democratic stand, and the latter party's Election System Investigative Committee executive member.

The Komeito Party is absolutely opposed to the Liberal-Democrats' reform plan and thus the latter's possible moves at the Special Diet Session worries Komeito. Consequently, they were relieved when "the informal feedback from two or three high level Liberal-Democrats indicated that there appears to be no strong move to drive through the reform." (Ohno)

Liberal-Democrat's Negotiable Item

At present, the Opposition is unexpectedly calm with respect to the Liberal-Democratic Party's move to present the redistricting proposal at the Special Session. The Komeito and Democratic Socialist parties which had opposed the Liberal Democrats' proposal at the previous regular session of the Diet have reversed themselves. "We have no immediate plans for launching a countermove." (Ohno) "We do not even have plans for an intra-party meeting before the Special Session." (Democratic Socialist Party Election Countermeasures Committee Chairman Fujii) The Socialist Party had compiled its own Responsive Proportionate Representation Plan prior to the Liberal Democrats, and thus, the party's predominant opinion at the regular session--led by the party's Special Committee on Election System Countermeasures--was for "adoption of the Liberal-Democratic plan." But now, such voice has abated and they appear to be resigned. "Passage of reform at the Special Session of the Diet is highly unlikely." (Special Committee on Election System Countermeasures Director Saito)

Why has there been this uniform shift of opinion among the Opposition? Socialist Party Central Executive Committee Chairman Tobita states that, "we have our hands full with administrative reform questions and there is no room for considering the national constituency system for the Upper House. Since the Special Diet Session has become a single issue (administrative reform) session, the interest toward the national constituency system for Upper House election has waned. Moreover, there is an interpretation that "the Liberal-Democrats must have the cooperation of Komeito and Democratic Socialists in passing the administrative reform measures. Perhaps it is their opinion that no good will come of antagonizing Komeito and Democratic Socialists by pressing the national constituency for the Upper House issue, especially when they have just obtained Komeito and Democratic Socialist support on the administrative reform question." (Komeito leadership's view).

The Opposition's view is that, "the Liberal-Democrats' motive in submitting the national constituency plan at the Special Session is merely to use it as a negotiable item vis a vis the administrative reform proposals. And no one is expecting that there is any likelihood of the passage of the nationwide redistricting proposal at the Special Session.

Prime-Minister's Face Must Be Saved

The only problem here is how will the Liberal-Democratic proposal (on redistricting) be handled at the Special Diet Session. That is, it is a question of how it will be settled. Among the Opposition, some hold the hard line: "Reject the proposal absolutely!" The majority, however, anticipate "a continued deliberation." The consideration here is, "how to resolve it without damaging Prime Minister Suzuki's face, since it was his foremost public promise at the time of his taking office. There can be no self-contradiction. [There must be consistency.]" (Socialist Councillor Sango Satao) Next comes the plan for a creation of the deliberative body that would examine the national constituency system for the House of Councillors with the party in power and the Opposition sitting at the same table.

"Once deliberative committee is created for examining all the reform plans including the Liberal Democratic proposal, then it would make it easier for the Liberal-Democratic Party to retract its plan without embarrassment." (Fujii) And there are those who say that, "since Prime Minister Suzuki wants the reform measure to be a bi-partisan decision, a bi-partisan discussion with a view to the 1986 Election would be satisfactory." (Socialist Party leadership) Still others (Democratic Socialist leaders) look upon this deliberative committee as a final resting place for the Liberal-Democratic proposal. Once in the committee, it can be allowed to fade out and eventually, it can be dropped.

Back to the Beginning

But even if the Opposition's strategy succeeds and the Liberal-Democratic proposal is shelved, the problems associated with the current national election district system will remain and the differences among the parties will still smoulder. That is, under the currently effective system, only union officials who are

allowed both money and time can run for office. Scholars and cultured people that the parties ought to have as members are barred from becoming Diet members." (Socialist Party Secretariat Director Sato)

For this reason, a substantial number of Socialists believe that, "there is no other solution save for the responsive proportionate representation system." (Diet Policy Committee Chairman Yamaguchi). Komeito and the Democratic Socialist Party, in the meantime, are still adhering to the "block plan"--their alternative to the Liberal-Democratic proposal. In all likelihood, the debate concerning the national constituency system for the House of Councillors will go back to the beginning, and the question will probably be deferred until the next regular session of the Diet.

LDP Presents Bill To Revise Election Law

Tokyo NIHON KEIZAI SHIMBUN in Japanese 31 May 81 p 2

[Text] The Liberal Democratic Party (LDP) has presented the Diet with a bill to revise the Public Election Law to introduce a proportional representation or system [Kosoku Meibo-Shiki Hirei Daihyo sei] instead of the national constituency system, and the ruling party has every intention of passing the bill at the extraordinary session in the fall. The LDP is undertaking quite a task because this is the first attempt to revise the Upper House election system that includes the national constituency system, which forces candidates to spend tremendous amounts of money and to campaign hard to win seats in the Upper House, unless a candidate happens to be a "talento" (celebrity), a well-known bureaucrat or a labor union leader.

Revision of the Public Election Law to introduce a "proportional representation system" has many times been studied and debated at the Diet since the Meiji era, but the representation system was never adopted simply because candidates would have a difficult time forecasting election results.

In order to revise the Public Election Law in time for the next Upper House election in 1983, the LDP must get the Diet to approve the bill this year. However, the LDP and the opposition parties must work it out to agree to pass the bill first. The Japan Socialist Party (JSP) supported the LDP's ideas until recently, but now it is sending out negative signs. Komeito, the Democratic Socialist Party (DSP) and the Communist Party (JCP) are opposed to the bill.

The LDP's bill will do away with the "one vote" system based on votes cast for a candidate in the local constituency. Under the proposed system, even if voters do not want to vote for a candidate in the local constituency, they can still write in the name of a candidate in the national constituency.

The one-vote system was criticized for running counter to the principles of the constitution, while the two-vote system is easily understood.

Another characteristic of the bill is that it calls on political parties to list not only its members but also to list the candidates it recommends. The purpose

is to set "celebrities" in various sectors of society to win seats in the Upper House. First the political parties will give priority to candidates who are their own members, however, in the long run, they will build up candidates other than their own members. Under the new system, persons can win the Upper House election without doing much campaigning. This will probably encourage capable persons to run in the Upper House election.

One fault of the LDP-proposed bill is that persons seeking to win a seat in the Upper House as non-affiliated candidates are deprived of the opportunity to run independently. The new bill stipulates that political parties and other organizations which are entitled to submit the lists of candidates are: 1) those who have more than five (5) Diet members each; 2) those who have won more than four (4) percent of votes cast in the latest Lower House election or Upper House election; and 3) those who have more than 10 candidates.

Those candidates who are planning to win seats in the Upper House as non-affiliated candidates are naturally opposed to this requirement. In the "double elections" held in 1980, five (5) non-affiliated candidates managed to gather more votes than all JSP candidates combined. In the next election, the LDP is reported to have a stake in four (4) non-affiliated candidates, thus estimated winning seats to be 25 in all.

Unless the LDP takes a more flexible stance on the three conditions, the possibility of passing the bill in the Diet this fall is remote.

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SCIENCE AND TECHNOLOGY

FOREIGNERS SEEN DOMINATING GENE ENGINEERING PATENTS

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 31 Aug 81 p 33

[Text] It is said that the Japanese industrial circle turned pale at the news of confirmation of the United States patent regarding recombinant DNA (deoxyribo-nucleic acid) at Stanford University. "If the same thing materializes in Japan, we are finished during the effective term of the patent as far as the gene splicing technique is concerned." Be it gene splicing or technologies in other areas, achievements in most research and development are introduced into the world armed with patents. In order to win research and development competitions, one may say that all that matters is how strong a patent right was obtained. In an unexplored technology such as gene splicing, the battle for encampment called patents will be fought all the more severely. Therefore, the problem points of the offensive-defensive battle of patents that began with the Japanese Patent Agency as the arena have been sought mainly through the opinions of the people involved.

As you can see from the table, applicants with Katakana [used for transliteration] names are listed one after another. Nearly 80 percent of the applications are from foreign countries. We may assume that the competition for application began with an overwhelming dominance of the foreign powers.

As for the contents of the applied inventions, according to the data published outside by the Patent Agency, recombinant DNA itself and its manufacturing processes comprise 30.5 percent. DNA vectors themselves and their manufacturing processes, 25.9 percent; manufacturing processes for substances, 19.4 percent; and the recombined organisms (microorganisms) themselves and their manufacturing processes, 16.6 percent, in that order; and many of them are related to the basic parts of the splicing operation.

Those which may be cited among them as representative applications for inventions are from the ICI in England, University of California and Genentech in the United States, and Max Planck Institute in West Germany, etc.

The inventions of the British ICI are "a genetic modification process for microorganisms" and "manufacturing process for single cell protein," and the one by the Max Planck Institute is "a manufacturing process for linear hybrid phage."

Those from the University of California are entitled "DNA transduction vector," "purification process for fragments of nucleotide sequence," etc. And, the applications from Genentech are "synthetic DNA and its regulation," and "methods for expression and improvement of microbiological polypeptides."

Other prominent applications include "mutant microorganisms and their manufacturing processes and applications" by Research Incorporated and "microorganisms and their regulation processes" related to Pseudomonas bacteria by General Electric (GE).

Among the Japanese applications, those related to restriction enzymes that are used for cutting and splicing DNA are predominant. It is said that this is due to the delayed establishment of Japanese experimental guidelines for recombinant DNA, which promoted research in the area of restriction enzymes unrelated to the guidelines.

As we look over the list, we notice unexpectedly the fact that the invention entitled "construction of biologically active DNA" by Professor Cohen, et al. at Stanford University, which is said to be the basic patent among the basic patents, has not been applied in Japan.

Regarding this fact, patent personnel in industrial circles surmise that they probably gave up the Japanese application due to differences between Japanese and American regulations.

In the States, a system of prior right of invention prevails, and even if the inventor published his invention at an academic meeting or in journals, it can be patented if application is made within a year. On the other hand, in Japan, the fact that the invention has been made known by the inventor [prior to patent application] is a reason for rejection. The Stanford University patent is a case that falls under this rule, and the prospect of its being patented in Japan is considered very slim.

K. Ono, chief of the patent department of Kyowa Hakko states with confidence "I don't think it was applied for in Japan. Besides, that invention was made possible with government support, and royalties must be turned over. In addition, they cannot demand royalties in an outrageous amount, as a rule. Even if the patent had been confirmed, research and experiments can be conducted freely (Patent law, article 69), and to say that the industrial circles turned pale is an exaggeration. The question of whether or not practicable technology will come out during the effective term of the patent right is more important."

K. Takeda, chief of the patent department of the Nippon Kayaku Co., Ltd., also criticizes the over-reaction of the outsiders saying "it is questionable to make a fuss without really understanding the patent system. It is conceivable that it may have an ill effect on research and development. I suppose it is more sensational to say that the industrial circles are struck down gaping."

When we speak of a patent war, it is not to say that Japan is defenseless. I may add the fact that there are many firms contemplating the fact that the time has come again to use patent control skills learned the hard way during the heyday of technical importation.

The Stanford patent seems to have resulted in "much ado about nothing." However, the true feeling in the industrial circles is probably a sense of relief deep inside.

Regarding this subject, the Patent Agency gave me a more specific explanation.

"The Stanford patent should have been disclosed by now even if they applied using the priority right (an advantage provided for those residing abroad with respect to the application period), but we have not found such an invention among them. However, in the United States, "new matter" may be added up to 3. And, the last one should still make the deadline, and we cannot say definitely that their Japanese application has not been made at all. However, compared with the basic invention, the effect would not be as great."

More of a concern than such a matter for the industrial circles is the delay in the Japanese guidelines for DNA experiments and problems with related patents. In other words, in Europe, the guidelines have already been relaxed and experimental research can be freely conducted. However, in Japan, there are some areas where nothing can be done due to the strict restrictions. If applications arrive from foreign countries for inventions in these areas, how would the Patent Agency handle the case? It is said that several such applications have already appeared as actual problems.

Concerning this matter, a scientific investigator of the Science and Technology Agency, A. Matsuda states "we have made a request to the Patent Agency to examine these cases based on the experimental guidelines."

For the Patent Agency, how to justify rejection is a headache. Basically, as long as the patent requirements are fulfilled, they are in a position inevitably to register the patents.

There are voices in the industrial circles that the stipulation in article 32 of the Patent Law "inventions that may be harmful to public health" should be applied.

However, there are voices, too, that "the experimental guidelines are a domestic problem in Japan. Thus, to think that there is no way to hold foreign inventions is a disgrace for a country noted for technology. When there is the prospect that safety can be assured in the future, they should be patented. The Patent Agency should judge independently according to the Patent Law /denying patents on/. These voices are rather more predominant.

The Patent Agency apparently plans to require an indication of detailed data concerning the safety for those cases that do not meet the guidelines. To cope with this, the applicants are likely to be required to receive individual examinations by the Council for Science and Technology and the Science Council of the Ministry of Education to prove safety.

Dr K. Sakaguchi at the Life Science Research Institute of Mitsubishi Chemical Industries, an inventor of a preparation process for thermostable enzymes states that from the standpoint of the researchers "Such misgivings are encountered

because of the existing gap in guidelines. We, researchers always wish for a chance to compete on a common ground. Researchers generally lose their research ambitions when they are restricted this way and that way as to the experimental methods and facilities."

There are some among them who state practical techniques in gene splicing technology are not likely to materialize so easily during the patent term of 15 years or so. That considerable technical differences have been produced is an undeniable fact, and I don't believe that crying for urgent relaxation of experimental guidelines is very meaningful."

In opposition, Dr Sakaguchi urges a relaxation of the Japanese guidelines saying "On the contrary, applied microbioengineering and enzymology in Japan are the scientific fields at the top of the world. Because this technology can be applied, there is virtually no delay in the field of agricultural chemistry. Especially, speaking from our standpoint, I would like them to make the plant microorganisms usable as hosts or vectors."

From 1 July, the U.S. National Institute of Health drastically relaxed the U.S. guidelines once again. Irritation of the Japanese researchers is likely to continue for a while.

Separate from the guidelines, one of the problems is that the foreign applications are written with a very extensive scope of patent claim. Concerned voices are increasing sensing their purpose to be containment against Japanese research and development. On the other hand, the Patent Agency observes that "new technological fields tend to have extensive claims. Their purpose may also be in feeling how we handle them at the Agency. Amendments may be forthcoming at the time of the request for examination and the submission of argument against the notice of rejection and reasons.

Actually, it is said that the Agency has sent out notices of rejection and reasons for 2-3 cases. The reasons are said to be too extensive claims.

When we consider the special additional period allowed for those residing abroad, the amendment for or argument against the notices of rejection and reasons from the applicants in Euro-American countries will be returned around October. Then, the purposes of the Euro-American firms and research organizations will be revealed for the first time. The genetic patent No 1 in Japan will appear only after that. The patent war in the true sense will begin from that moment, and the moment of truth will be there for the Japanese industrial circles also.

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Patent Applications Related to Recombinant DNA Technology

Title of Invention	Applicant (Country given is where the 1st appln. was made)	Date of application
-Microorganisms and their regulation processes	General Electric (USA)	6/7/73
-Genetic modification process for microorganisms	ICI (Eng.)	8/8/75
-Manufacturing process of a new amylase	Maruo, Yoneda, & Tamura	12/19/75
-Mutant microorganisms and their manufacturing processes and applications	Research Incorporated (USA)	9/30/76
-Manufacturing process for insulin using genetically transformed bacterial cells	Univ. of Minn. (USA)	4/23/77
-New strains of bacteriophage and their construction	Noda Sangyo Sci. Res. Lab.	4/26/77
-Plasmid control processes	Mitsubishi Chem. Ind.	8/8/77
-Plasmid control processes	Mitsubishi Chem. Ind.	9/7/77
-Preparation of linear hybrid phage and how to synthesize metabolites, insulin, insulin-derivatives, antigens and antibodies.	Max Planck Inst. (W. Germ)	3/17/78
-DNA transduction vectors	Univ. of Calif. (USA)	5/27/78
-Purification process for fragments of nucleotide sequence	Univ. of Calif. (USA)	6/5/78
-Manufacturing process for single cell protein	ICI (Eng.)	9/8/78
-Construction of newly recombined DNA	Noda Sangyo Sci. Res. Lab.	10/25/78
-Construction of newly recombined DNA	Noda Sangyo Sci. Res. Lab.	10/30/78
-Synthetic DNA and its regulation	Genentech (USA)	11/6/78
-Expression of microbiological polypeptides and modification of the means	Genentech (USA)	11/6/78
-Expression of microbiological polypeptides and the means	Genentech (USA)	11/6/78
-Cultivation of microorganisms	Ajinomoto	3/15/79
-Preparation of hybrid bacteria	Für Biotechnologisch Forschung (W. Germ)	3/28/79
-Preparation of L-threonine by fermentation	Ajinomoto	4/2/79
-Modified DNA and its use in preparation of a hybrid protein	Pasteur Inst. (France)	4/13/79
-A process to stabilize properties of microorganisms containing plasmids	Ajinomoto	5/23/79
-Preparation of selected proteins	Harvard Univ. (USA)	6/4/79
-Preparation of proteins, modified DNA, and applicable vectors in these processes	Pasteur Inst. (France)	6/8/79
-Preparation of thermostable enzymes	Mitsubishi Chem. Ind.	6/22/79

-Preparation of L-lysine by a fermentation process	Ajinomoto	7/23/79
-Synthesis of eukaryotic proteins by microorganisms	Univ. of Calif. (USA)	8/10/79
-Preparation of high molecular weight proteins	Upjohn (USA)	8/21/79
-Plasmids	Mitsubishi Chem. Ind.	9/5/79
-Protein production at the initial synthesis point	Stanford Univ. (USA)	10/9/79
-Preparation of glucose isomerase	Upjohn (USA)	10/17/79
-New recombinant organism having genes exhibiting complementarity to human interferon messenger-RNA	Cancer Center	10/30/79
-Vectors suitable for inserting exogenous DNA fragments that correspond to any possible translation steps into those genomes; and their preparation	Pasteur Inst. (France)	11/13/79
-New hybrid plasmids and microorganisms containing them	Agence Nationale de Valorisation de la Recherche	11/14/79
-Vectors that enable insertion of eukaryotic or prokaryotic genes and excretion of expressed proteins	Pasteur Inst. (France)	11/27/79
-Recombinant DNA molecules and their preparation	Biogen (Eng.)	12/20/79
-Stable, numerous copies of plasmids	Cetus (USA)	12/26/79
-Artificially attached gene coding for protein synthesis and protein production processes	Harvard Univ. (USA)	1/16/80
-Plasmid PUC6 and its preparation process	Upjohn (USA)	3/3/80
-Plasmid PUC1 and its preparation process	Upjohn (USA)	3/21/80
-Plasmid PUC2 and its preparation process	Upjohn (USA)	3/21/80
-Plasmid PUC8 and its preparation process	Upjohn (USA)	3/21/80
-Plasmid PUC9 and its preparation process	Upjohn (USA)	3/21/80
-Synthetic influenza genes	G. D. Searle (Eng.)	4/1/80
-Plasmid PUC7 and its preparation process	Upjohn (USA)	4/7/80
-Preparation of L-threonine	All Union Research Institute (USSR)	4/30/80
-Plasmids and their uses	Gist Brocades (Holland)	5/12/80
-Non-permeable virus	Univ. of Calif. (USA)	5/24/80
-DNA transduction vectors	Univ. of Calif. (USA)	6/2/80
-Plasmid vectors, their preparation and applications	G. D. Searle (USA)	6/2/80
-Microbiological expression of partially synthetic genes	Genentech (USA)	7/4/80
-Heteropolysaccharide produced by microorganisms	Unilever (Holland)	7/10/80
-phoA-mutant bacteria E. coli SB44; its preparation; isolation of plasmids containing phoA-genes using the above process; new plasmids and plasmid vectors; preparation of plasmids containing phoA-genes;	Schering (W. Germ)	8/4/80

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preparation of new bacterial strains; and preparation of alkaline phosphatase		
-*Bacillus subtilis* mutants and their applications	Univ. of Rochester (USA)	10/2/80

Major Applications Related to Restriction Enzymes

-Preparation of a new nuclease	Inst. Phys. Chem. Res.	10/8/75 7/31/80 (Registered)
-Preparation of a new nuclease	Inst. Phys. Chem. Res.	7/23/76 5/26/81 (Pat. Publn.)
-A new nuclease and its preparation	Inst. Phys. Chem. Res.	10/14/77
-Preparation of deoxyribonucleic acid ligase	Inst. Phys. Chem. Res.	11/22/77
-Biochemically active, fixed restriction endonuclease derivatives and their preparation	Bethesda Research (USA)	5/31/78
-Preparation of Nuclease	Inst. Phys. Chem. Res.	7/28/78
-Regulation of endonuclease	Mitsubishi Chem. Ind.	9/20/78
-Regulation of endonuclease	Mitsubishi Chem. Ind.	9/25/78
-Preparation of a new nuclease	Inst. Phys. Chem. Res.	10/16/78
-Preparation of a new nuclease	Inst. Phys. Chem. Res.	10/16/78
-Preparation of a new nuclease	Inst. Phys. Chem. Res.	10/16/78
-Preparation of a new nuclease	Inst. Phys. Chem. Res.	10/16/78

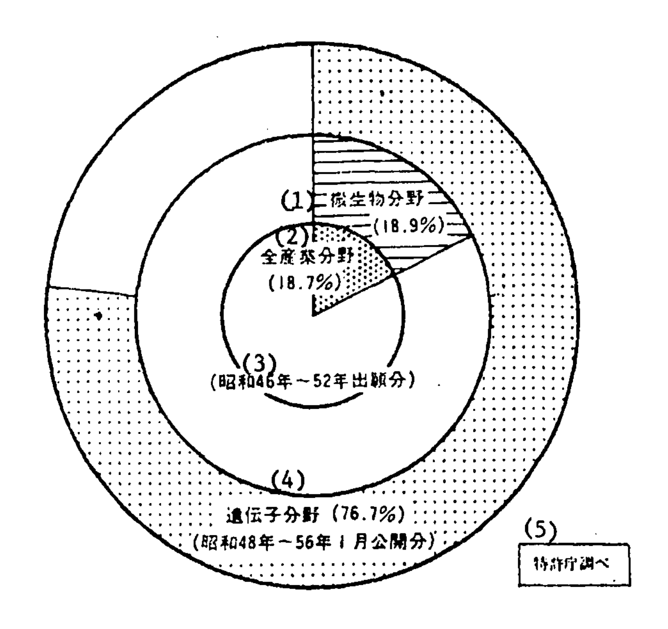
(Cases open as of the end of July 1981)

Data supplied by: Japanese Patent Information Center; search-classification guidance by the Patent Agency.

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Foreign Patent Applications in the Area of Genetic Manipulation Technology in Comparison with Other Areas



Key:

1. Field of microbiology (18.9%)
2. All industries (18.7%)
3. (Applications during 1971-77)
4. Field of genetics (76.7%) (cases opened during 1973-Jan '81)
5. Patent Agency data

7722
CSO: 8129/1918

SCIENCE AND TECHNOLOGY

JAPAN, FRANCE JOINT INTERFERON TESTING

Tokvo JAPAN ECONOMIC JOURNAL in English Vol 19 No 974, 29 Sep 81 p 9

[Text] Japanese and French virus experts will put interferon on clinical trial, as produced by Hayashibara Biochemical Laboratories, Inc. of Okayama.

The six Japanese experts include executives of Kitazato Institute and the National Institute of Health. The five French participants include experts at two national organizations: l'Institut Pasteur and l'Institut National de la Sante et de la Recherche (INSERM).

The two French organizations' tests will be designed to confirm the Hayashibara interferon's effectiveness against kynophobia and leukemia. Following studies in France, Japanese virus authorities hope they can do similar tests with the approval by the Ministry of Health & Welfare.

Fifty billion units of the interferon are to be supplied by Hayashibara, which claims to be the world's largest producer of the virus inhibitory factor, and the French researchers will soon start clinical tests on kynophobia patients. The plans for clinical trials were formulated after Prof. Tsunataro Kishida of Kyoto Prefectural University of Medicine arranged the interferon supply to INSERM.

CSO: 4120/20

SCIENCE AND TECHNOLOGY

PLANT GENE HUNTING EXPEDITION ENVISAGED FOR YUNNAN PROVINCE

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 973, 22 Sep 81

[Text]

A large-scale botanical gene hunting expedition is going to be dispatched to China's Yunnan Province by the Japanese Ministry of Agriculture, Forestry & Fisheries sometime next year.

According to the Ministry, many nations, led by America and the Soviet Union, have been getting busy in recent years hunting for various breads of wild plants not found in their own territories for artificial development of new species of food and feed crops. Japan has also been engaged in such a drive, but so far on a minor scale. Such efforts invariably involve gene recombination, cell fusion, and other kinds of biotechnology.

The common aim is to introduce the strong natural survival and reproduction capacities of wild plants to frail human-cultivated farm plants for more productivity with less care. Trials to develop new breeds of rice or other crops that need no fertilization are already in progress in America, Japan or elsewhere.

Collections of such plant samples, in the form of seeds, are already well known in the U.S., Russia and many other countries as a agricultural "gene banks." Japan has its gene bank, but of a small scale, in an internationally-gathered assembly of about 30,000 kinds of seeds at the Ministry's Agricultural Engineering Research Station, Tsukuba.

But the American and the Soviet gene banks are said to be each 10 times as large.

However, as far as Yunnan, remote southern province of China, is concerned, hardly any foreign hunt of the kind is known to have been so far conducted there. The Japanese expedition is thus expected to become the first major international exploration team of such a nature.

The expedition can be expected to gather many potentially important samples because the province bordering on the eastern end of the Himalayas and on Burma, Laos and Vietnam has been well known as the world's last remaining undeveloped "treasure trove" of wild plants, including the origins of the rice, wheat, soybean, tea, loquat, melon and many other kinds of grain, vegetable and fruit plants. The province thus fully deserves its sobriquet of being "the home of farm crops."

According to the Ministry, its expedition plan was approved by the Chinese agricultural authorities when it was proposed by Japanese Agriculture, Forestry & Fisheries Minister Takeo Kameoka during his recent visit to China.

Details of the plan are expected to be studied and decided next February at the first session of the Japan-China agricultural scientific and technological interchange project group taking place either in Beijing or Tokyo. The expedition is thus likely to be realized as a joint survey group with the participation of Chinese experts.

CSO: 4120/19

SCIENCE AND TECHNOLOGY

GOVERNMENT EFFORTS IN BIOTECHNOLOGY DISCUSSED

Development of New Agricultural Products

Tokyo NIHON KEIZAI SHIMBUN in Japanese 7 Aug 81 p 1

[Text] There is a growing movement in the government and LDP to develop new seeds for agricultural products, using biotechnology, as a strategic Japanese industry. It is said that this field of advanced technology will revolutionize world agricultural production. The Ministry of Agriculture, Forestry and Fishery has taken a big step forward from previous basic research. Beginning in FY 1982, it will begin serious research and development for practical application in such facilities as the Agricultural Technology Research Laboratory (Tsukuba). The first research subject to be undertaken is cell fusion, by which completely new seeds can be produced from the cells of different kinds of seeds. The LDP has decided to organize a "Biotechnology Research Association" (tenative name) by September and actively promote the development of new seeds. Specific product development is up to private industry. Therefore, ways of speeding up application are under consideration. These include making research results from the Ministry of Agriculture, Forestry and Fishery and other agencies available to private industry and ultimately setting up a technological research association composed of a number of companies.

LDP To Organize Research Group in September

The government and LDP decided to accelerate the development of new seeds using biotechnology because this technology, along with aerospace development and electronics, is an important technology which will help determine the future prosperity of the country. Japan lags far behind the United States in biotechnology and a very strong research and development system will be necessary to catch up.

The United States is at the forefront in biotechnology and is expanding applied research in the fields of agriculture and botany. One example is an experiment to produce rice plants which will grow in the desert by combining the genes of legumes, which can produce the nitrogen needed for plants to live, with rice plants. It is said that the United States is beginning to collect new types of plants which have possibilities for increased production of food from South America, China, and Southeast Asia for the purpose of keeping a stable food supply, and that it plans to create a "plant gene bank" in the near future.

The grand U.S. strategy is to grab up the "raw materials" of the world's plant genes ahead of other countries. Thus, when a food war begins, it will have the advantage.

The Japanese government is also forced to come up with some form of countermeasures. Also, not only the American seed companies, but many major corporations, including the major oil companies, have entered this field and are rapidly doing research.

The Ministry of Agriculture, Forestry and Fishery has been carrying out basic research to develop new seeds with biotechnology at the Agricultural Technology Research Laboratory in the Tsukuba academic city and the Plant Virus Research Laboratory. Beginning in FY 1982, it plans to begin doing applied research in earnest. Cell fusion research and development will begin in FY 1982. This is a technology for producing new seeds by combining the cells of different types to utilize the characteristics of both. For example, by combining tomato and potato plants, it is theoretically possible to produce a new plant which produces potatoes below ground and tomatoes above ground. The Ministry of Agriculture, Forestry and Fishery has requested a budget for this as one of its most important projects for next fiscal year.

Also, it is planning to make an effort in a very important area, searching for and storing up seeds and seedlings (for example, rice which can grow in cold climates and soy beans which have large amounts of protein). They are the basic ingredients in research and development of new seeds.

Meanwhile, in the LDP, there is a rapidly growing feeling that the creation of new seeds by means of biotechnology must be cultivated as a strategic industry. The Comprehensive Agricultural Policy Research Committee (Hyosuke Niva, chairman) and the Agriculture and Forestry Subcommittee (Tsutomu Hata, chairman) of the LDP, plan to jointly organize a research association and promote it in terms of the budget. The research association is scheduled to begin meeting in September.

The feeling is strong in the LDP that research and development should be speeded up in this field in order to secure a stable supply of food. Also, it believes that the government and industry should join together to carry out research and development in order to make this a strategic industry which could export products in the future, and therefore, it regards that it is essential that private research be extended along with the basic research carried out by the Ministry of Agriculture, Forestry and Fishery.

On the private level, food, fertilizer, chemical, and agricultural machinery companies have joined with specialists recently to organize the New Seed Protection and Development Research Association (Tatsuzo Minakami, director). Movements to accelerate development of new seeds with biotechnology are gaining momentum. The Ministry of Agriculture, Forestry and Fishery and the LDP are paying attention to these movements and in FY 1982 they plan to promote even more actively the mutual efforts of government and industry in the realm of information exchange and exchange of research and development results.

New technological developments in the field of biotechnology will require large amounts of funding as well as the compilation of research and development results. In VLSI development, another advance technology field, major private companies have created a joint research organization (the VLSI Technology Research Association) and the government provides it with technical and financial assistance. Many people think

that because the development of new seeds is a similarly important technology, a similar joint research body should be organized and research and development should be carried out with government involvement.

Massive Cell Cultivation Restrictions

Tokyo TOKYO SHIMBUN in Japanese 25 Aug 81 p 1

[Text] The Science and Technical Council (Prime Minister Suzuki, chairman) has adopted a policy of organizing a subcommittee of the council's Life Science Committee in the near future to study mass cell cultivation technology. This subcommittee will review the mass cell cultivation regulations, which have been a bottleneck for the field of gene recombination, in preparation for the era of practical application of gene recombination technology. The subcommittee will examine the problems which may result from mass cultivation of new microorganisms produced through gene recombination. At present the capacity of the cultivation tank is limited to a maximum of 20 liters. If this restriction is relaxed, it would remove a great obstacle for manufacturers aiming at production of pharmaceuticals through gene recombination.

Gene recombination is a technology by which the genes of life forms such as mammals or primates are combined with colon bacilli or yeast to study the structure and function of genes and produce pharmaceuticals such as insulin. Since new microorganisms which do not exist in nature are produced, the government adopted guidelines in 1979 for gene recombination experiments, based on U.S. guidelines, in order to prevent the mass occurrence of harmful life forms.

These guidelines have been reviewed three times and gradually relaxed, for example, by allowing the proliferation of types of microorganisms with which the genes of other life forms can be combined (hosts). However, even now, the Japanese experiment guidelines are said to be the strictest in the world, and academic societies, such as the Japan Molecular Biology Association, are clamoring for relaxation of the rules.

The researchers say that the rules making it mandatory to keep the microorganisms with recombined genes sealed up in the laboratory restrict free research and they want the restrictions mitigated. However, the main obstacle for manufacturers who want to industrialize gene recombination is the rule against mass cultivation of the new microorganisms produced with this technology.

The 1979 experiment guidelines definitely limit research to the laboratory level, restricting the capacity of cultivation facilities to 20 liters. In contrast, the United States experiment guidelines allow a capacity of only 10 liters, but permission for mass cultivation by industry can be obtained by applying to the National Institute of Health (NIH) and having a check made. So in reality, mass production by industry is unrestricted.

None of the Japanese pharmeceutical and chemical manufacturers have yet begun full-scale production using gene recombination, but repeated inquiries have been made to the Science and Technology Agency by these manufacturers as to when the capacity restrictions will be relaxed.

The opinion of the industry, as expressed by Yoshiaki Kawamori, executive managing director of Kyowa Hakko Kogyo, Inc., is: "If the tank capacity is restricted to 20 liters, we can produce only enough interferon for a few people a month. Permission for mass cultivation is essential for industrialization." The Science and Technical Council set up a new subcommittee as a response to the strong demands of the industry for reduced restrictions as they prepare to commercialize gene recombination.

The Life Science Committee is now reviewing the capacity regulation, and the Recombined DNA Subcommittee of the Science Council of the Ministry of Education has received requests from academic circles for relaxation of the regulations. These committees are examining the experiment regulations with the aim of relaxing them to the same degree as the United States by this fall. Japan is behind the United States and Europe in the field of genetic engineering and the efforts to relax regulations are going ahead at a rapid pace.

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SCIENCE AND TECHNOLOGY

FIRMS CHOSEN TO TAKE PART IN 10-YEAR GOVERNMENT R & D PLAN

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 973, 22 Sep 81 p 12

[Text]

The Ministry of International Trade & Industry tentatively has chosen 67 companies as possible recipients of its long-planed research and development service assignments to create numerous innovational technology of national importance under a 10-year program costing ¥104 billion.

The program, to be inaugurated from October 1, is known as the Next Generation Industrial Foundation Technology Development System.

According to sources close to MITI, its final screening of the companies to be entrusted with such important research and development jobs and its signings of contracts concerned are scheduled to be completed by the end of this month.

MITI is said to have obtained the Government's go-ahead to launch the new program on the strength of the now widely admitted and impending need for the nation to be on its own in the earliest possible future in developing its industrial technology of all sorts.

Japanese industries in the areas of the world's most promising scientific and technology advances including electronic, optical fiber communication, steel, machine tool timepiece, automobile, industrial robotization and genetical engineering, have recently been drawing wide international attention for their rapid technological sophistication. As far as such areas are concerned, Japan is believed to be no longer inferior to any advanced Western nation or even leading the whole world.

As things stand, highly advanced Western industrial enterprises are getting increasingly reluctant to transfer their technologies to would-be Japanese licensees. That has given rise a logical reasoning that time is approaching when the Japanese will have to bid farewell to their traditional practice of importing basic Western technological ideas, improving and refining them into highly efficient practicable types.

MITI's invitation of would-be Japanese recipients of its important service assignments closed of late has brought applications from 90 leading Japanese industrial enterprises, all well known for their high standards of technology and researches concerned. Although the number of applicants may have been rather few, competition for the final choice is believed to have been extremely stiff because every one of the applicants was confident in its technological leadership in its own industrial field.

Most of the applicants recently have got together by speciality and organized five research associations to get ready and vie for MITI's ultimate assignments. But MITI is said to be chiefly eyeing the technological development potential of each applicant rather than its past or present technological achievements since the proposed studies are invariably futuristic types intended for tomorrow's Japanese industries.

The program roughly divides into three mainstay themes to develop:

—A series of innovational industrial material.

—All sorts of new kinds of biotechnology including development of a bioreactor, gene recombination and cell fusion types.

—A series of revolutionary semiconductors.

Just like space and ocean

development efforts, the program promises countless direct and indirect industrial benefits in bringing hitherto unimaginable high value-added, energy, raw material, and labor-saving, health and medical care, food and energy supply revolutionizing, and communication and space development sophisticating facilities and processes.

The innovational industrial material development theme divides into six specific themes ranging in 10-year cost between ¥5 billion and ¥13 billion; the biotechnology theme three specific themes requiring from ¥10 billion to ¥15 billion; and the semiconductor theme into three specific themes costing between $8 billion and $9 billion.

Possible Participants in MITI's Next-Generation Technology Development Program

Engineering (fine) ceramics (15 firms): Toshiba, Showa Denko, Denki Kagaku Kogyo, Kyoto Ceramic, Asahi Glass, Toyoda Machine Works, Kobe Steel, Toyota Motor, Inoue Japax, Sumitomo Electric Industries, Kurosaki Refractories, Shinagawa Refractories, NGK Spark Plug, Ishikawajima-Harima Heavy Industries, and NGK Insulators

Super-function high polymers (11 firms): Toray Industries, Asahi Chemical Industry, Asahi Glass, Kuraray, Sumitomo Electric Industries, Sumitomo Chemical, Daicel Chemical Industries, Teijin, Toyobo, Mitsubishi Chemical Industries, and Mitsubishi Petrochemical

New metallic and compound materials (17 firms): Fuji Heavy Industries, Mitsubishi Heavy Industries, Teijin, Hitachi, Toray Industries, Kobe Steel, Daido Steel, Mitsubishi Chemical Industries, Toyota Motor, Nippon Carbon, Toshiba Machine, Ishikawajima-Harima Heavy Industries, Mitsubishi Metal's central research laboratory, Hitachi Metals, Sumitomo Electric Industries, Mitsubishi Electric, and Kawasaki Heavy Industries

Biotechnology (14 firms): Mitsubishi Chemical Industries, Asahi Chemical Industry, Ajinomoto, Kao Soap, Kyowa Hakko Kogyo, Sumitomo Chemical, Daicel Chemical Industries, Takeda Chemical Industries, Denki Kagaku Kogyo, Toyo Jozo, Mitsui Petrochemical Industries, Mitsui Toatsu Chemicals, Mitsubishi Gas Chemical, and Mitsubishi Kasei Institute of Life Sciences

New-type semiconductors (10 firms): Mitsubishi Electric, Nippon Electric, Fujitsu, Matsushita Electric Industrial, Sharp, Oki Electric Industry, Sumitomo Electric Industries, Toshiba, Sanyo Electric, and Hitachi

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SCIENCE AND TECHNOLOGY

RATIO OF R & D TO SALES ALMOST AT U.S. LEVEL

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 973, 22 Sep 81 pp 1, 3

[Text] Japanese enterprises' research and development expenditure in fiscal 1981 will continue to register a two-digit per cent growth, and the ratio of such spending to sales looks due to attain the level of that of the U.S.

This is according to a survey by the Nihon Keizai Shimbun of companies listed on the nation's stock exchanges.

The R&D expenditure of the 743 big companies in fiscal 1981 will climb by 16 per cent over that of the preceding fiscal year to ¥2,350 billion, and the ratio of R&D spending to sales will rise to 1.94 per cent.

The R&D spending ratio is nearly the same as the average 1.98 per cent for American enterprises in fiscal 1980, the survey found.

The R&D spending is particularly conspicuous in the electric machinery and auto industries which are involved in a bitter international race to develop advanced technologies. Their R&D expenditures combined constitute half of the total R&D outlay as to symbolize the fact that they form the pivot of a nation that depends on technology for its existence.

The survey revealed that the R&D spending of the 743 companies grew by 17.8 per cent in fiscal 1980 to ¥2,022.7 billion, and is estimated to increase by 15.9 per cent to ¥2,345.2 billion in fiscal 1981.

As a result, the ratio of R&D expenditure to sales in fiscal 1981 will reach 1.94 per cent, compared to 1.77 per cent in fiscal 1979 and 1.79 per cent in fiscal 1980.

The Business Week magazine said in a survey sometime ago that the R&D expenditure of 746 American enterprises in fiscal 1980 reached $28,064 million. In terms of the yen exchange rate at the end of last year, this equals roughly ¥5,700 billion, or over twice that of Japanese enterprises. However, the ratio of R&D spending to sales is only 1.98 per cent. This means that the ratio for Japanese firms in fiscal 1981 virtually matches it.

With the 1973 oil crunch, economic growth dulled throughout the world, and the size of the economic pie became restricted. Along with this, it has become a byword that the survival of an enterprise in international competition in the 1980s now hinges on its technological supremacy.

In other words, what is causing the present swelling of R&D outlays is, as President Katsushige Mita of Hitachi, Ltd. has put it, that companies have begun to feel that "it is better for them to save up for the future rather than to think in terms of immediate profits."

The R&D outlays are particularly large for the electric machinery and automobile companies. The amount of these two fields combined (133 firms) in fiscal 1981 runs to ¥1,266.8 billion to comprise 54 per cent of the expenditure for all of the firms involved in the survey. In fiscal 1980, the share had been 53.4 per cent. Even in the Best 10 ranking as to actual R&D outlay in fiscal 1980, nine were either electric machinery or auto firms.

Both of these fields have built up their international competitiveness on the strength of their high technologies. In the case of electric machinery, technical innovation has been moving swiftly in such areas as semiconductors, computers, robots and optical fiber communication. This has thus led companies to pour money aggressively into areas of high technology.

For instance, Nissan Motor Co. Vice President Yoshihisa Yokoyama, in referring to the global small car war, says, "We are going to shift stress from the plant and equipment investment to research and development spending."

The survey showed that the ratio of R&D spending to sales for pharmaceuticals reached 6.8 per cent, far higher than the 4.6 per cent for electric machinery and 3.4 per cent for autos. This is because rivalry among drug makers to develop anti-cancer medicines and new antibiotics is intensifying, and the cost of such development also is soaring.

As for textiles and chemicals of the basic material sector, their makers are actively engaged in research to discover new ways for making money.

Toray Industries, Inc., the top producer of synthetic fiber,

already derives two-thirds of its profit from fields other than synthetics, and its accumulation of various technologies is changing the composition of its earnings. All of the textile makers also are expanding their R&D outlays in non-textile areas.

As to chemicals, many companies are putting weight on research in biotechnology which, as Masaki Yoshida, president of Mitsubishi Petrochemical Co., says "has an extremely high growth potential."

Meantime, the survey found this time that many enterprises were increasing their R&D spending despite their sluggish business trends at this moment.

Sample case was Mitsubishi Chemical Industries, Ltd., which in fiscal 1981 (term ending January, 1982) is spending ¥16 billion for R&D, 7 per cent more than for the preceding year. In absolute terms, this is the biggest outlay for a company in this field. However, in its business year ending January, its pre-tax recurring profits appears due to drop to ¥5.1 billion or less than one-third of the ¥17.8 billion of the preceding year. This shows that the company considers R&D spending an inevitable weapon for it to win out in competition.

Many thus feel that corporate research and development expenditure is destined to keep swelling despite slow business and dull global economic growth.

(R&D expenses covered by this survey are defined as expenses specifically needed for development of new products and technology, in production, marketing and administrative costs, as well as the portion amortized during the current accounting period out of expenses recorded as deferred assets on book. They include manpower cost. Another R&D survey by Nihon Keizai Shimbun reported on the Japan Economic Journal March 31, 1981 issue is based on increases in tangible fixed assets. The difference in the basis of the two surveys explains sharp discrepancies in figures.)

R&D Expenses in FY1980

(Ratio to total sales in % in parentheses)

		(In ¥ billion)
1	Toyota Motor	132.0 (4.0)
2	Hitachi	115.6 (5.9)
3	Matsushita Electric Ind.	101.5 (5.0)
4	Nissan Motor	100.0 (3.3)
5	Toshiba	74.3 (4.8)
6	Fujitsu	54.0 (9.3)
6	Honda Motor	54.0 (4.0)
8	Mitsubishi Electric	52.0 (4.3)
9	Nippon Steel	43.0 (1.4)
10	Sony	41.8 (6.9)
11	Toyo Kogyo	25.5 (2.5)
12	Nippondenso	25.0 (4.8)
13	Takeda Chemical Ind.	23.2 (5.4)
14	Tokyo Electric Power	22.2 (0.7)
15	Kobe Steel	21.3 (1.9)
16	Komatsu	20.9 (4.1)
17	Fuji Photo Film	20.4 (5.0)
18	Bridgestone	20.0 (3.9)
19	Matsushita Electric Works	18.3 (3.5)
20	Sharp	18.1 (3.6)

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SCIENCE AND TECHNOLOGY

NTT, IBM TO SWAP COMPUTER PATENTS

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 974, 29 Sep 81 pp 1, 15

[Text]

Japan's semi-governmental telecommunications company—Nippon Telegraph & Telephone Public Corp (NTT)—and International Business Machines Corp (IBM) of the U.S., the world's largest computer builder, have reached agreement in principle on mutually exchanging computer patents.

They are now due to boil down details and are expected, at the earliest, to formalize a cross-licensing contract when IBM's executives visit Japan in October.

This means that the negotiations for exchanging patents which had been under way between NTT and IBM have been virtually completed after a period of a year since autumn, last year. It will become the first instance of IBM signing such an agreement with a foreign government agency.

Many feel that mutual cooperation arrangement between the two "giants" of Japan and the U.S. will have a beneficial effect on the economic relations between the two nations.

The salient points of the basic understanding between them are:

—The objects of cross-licensing will be patents on information processing devices, such as computers and terminal equipment, and include electronic exchanges.

—IBM will accord "have made right" to NTT.

—The validity of the contract will be five years.

The cross-licensing arrangement had been proposed in the first place by IBM. At the beginning, IBM had hoped strongly to widen the scope of technological information exchange to the communications area in which NTT excels to an outstanding degree.

However, NTT contended there was a problem in including areas in which there was a one-sided superiority in technology by either party, in considering the character of cross-licensing itself.

From such a standpoint, it pressed for cooperation in only areas in which the strength of one just about matched that of the other. It was understood that IBM later conformed to the approach suggested by NTT.

In the case of NTT, which does not have manufacturing means, it stood to lose out in the cross-licensing unless it won sublicensing right with regard to makers. IBM also recognized this right.

Informants thus said that the latest understanding in principle between the two was favorable for NTT. As such, they expected also that the latest understanding would benefit NTT in its present talks for revising its cross-licensing contract with Western Electric Co., the patent channel of American Telephone & Telegraph Co.

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SCIENCE AND TECHNOLOGY

FUJITSU FANUC DEVELOPS ASSEMBLY ROBOT

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 973, 22 Sep 81 p 7

[Text] Fujitsu Fanuc Ltd. has developed two models of what it believes to be the world's first machine assembling robot of industrially applicable type.

It already has made three kinds of factory production material handling robots.

The company pins great hope on its new products from belief that they will go a very long way in automating machine-producing factory assembly line jobs hitherto heavily dependent on manual labor.

According to the company, its assembly robots of two models in weightlifting capacity, 5 and 15 kilograms at the maximum, are each of a high-speed, high-precision type with a working speed twice as fast as the best of the material-handling robots it has so far developed, and they have a machine part and component-placing precision 10 times as accurate as the latter's material placing accuracy.

Each is a cylindrical, coordinate type of robot of simultaneous, four-axis control functions, equipped in its control section with a 16-bit microcomputer, a custom-made large-scale integration type of semiconductor, a magnetic bubble memory unit, and a cathode ray tube Chinese character-using display device.

Because of the magnetic bubble memory unit, each robot is capable of memorizing no less than 6,000 different machine parts and components fixing positions and performing many different kinds of jobs at the same time.

Fujitsu Fanuc is planning to use the robots for its motor assembly factory. While it has been making 30 motors daily on the basis of a person working seven hours a day, it figures that if it uses three compact assembling robots and one handling robot, it will be able to produce 300 motors on a 24-hour basis. That means the four robots will produce 10 times as much as one worker per day. Such a rise in productivity is expected surely to bring at least a 30 per cent reduction in the production cost, it says.

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SCIENCE AND TECHNOLOGY

NIPPON ELECTRIC DUE TO 'FREEZE' 64K RAM OUTPUT

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 973, 22 Sep 81 p 8

[Text] Nippon Electric Co. (NEC), the nation's largest semiconductor manufacturer, will "freeze" production of 64-kilobit random access memory (RAM) chips at a level of 200,000-300,000 chips a month until the last half of next year.

The decision has come from its judgment that reckless mass-production might invite confusion in the 64K RAM market as computer builders and other major users have not yet completed evaluation of the first-generation product of so-called very large-scale integrated circuits (VLSI) upon test uses.

NEC's cautious step will have a far reaching impact on other semiconductor makers which have disclosed their 64K mass-production plans. They include Hitachi, Ltd. (which plans to produce 700,000 units monthly), Fujitsu Limited (600,000 chips) and Texas Instruments Inc.

NEC spent ¥30 billion in fiscal 1980 and earmarked ¥35 billion in fiscal 1981 for expansion and streamlining of its integrated circuits production facilities. It has been remodelling production lines at Sagamihara Works and at its subsidiary Kyushu Nippon Electric Co. to produce 64K RAM chips.

However, NEC has decided on a policy of refraining from boosting 64K RAM output at a stroke to a level of more than 500,000 chips monthly because it feels that major possible users still are not confident of the quality and efficiency of 64K RAMs. Once their assessment is made, NEC will be able to produce 1 million chips a month with its present production facilities after a two-month preparation, said Vice President Atsuyoshi Ouchi.

NEC's production control is expected to stimulate the 64K RAM market which has been softening at a fast pace, with quotations dropping to one-tenth that of a year ago (JEJ-September 15 issue).

NEC is a leading semiconductor supplier, controlling 15 per cent of the world's market as far as 16K RAM chips, the product preceding 64Ks, are concerned.

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SCIENCE AND TECHNOLOGY

RIVALRY IN BUILDING PLANTS FOR HELIUM INTENSIFYING

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 973, 22 Sep 81 p 9

[Text] Helium activities are being stepped up, including new entries and production capacity increase, because the demand is going up fast for such applications as gas chromatography, welding, heating medium in atomic energy plants, semi-conductor production and "man-made air." The activities partly reflect the high-pressure gas industry's intention to promote the more profitable special gas line.

Japan Oxygen Co., a leading gas producer, has tied up with a gas trader to set up a jointly-owned helium filling center near Tokai village, nuclear mecca. By investing ¥300 million, the company plans to complete a helium filling plant there. It will become the firm's second such plant after one of the Japan Helium Center, a consortium JOC started with, among others, Airco Inc. of the U.S. At Tokai, JOC will fill small containers with helium imported from the U.S. company for sales in and near Kanto region. Annual sales of 200,000 cubic meters are estimated, with Japan Atomic Energy Research Institute and research centers in Tsukuba (a "science city") counted as likely major clients.

Koatsu Gas Kogyo, which intends to venture into helium along with Iwatani & Co. and Showa Denko K.K., plans to build similar facilities at Chiba City at ¥200 million for gas sales to the semi-conductor industry. SDK, a Tokyo Gas subsidiary and two high-pressure gas firms, meantime, have agreed to set up a consortium to import liquefied helium from Union Carbide Corp. They will equally share the imports, following the setting up of their consortium. Until the consortium plan was formulated, only four firms sold the special gas, including JOC, Daido Oxygen Co. and Teisan K.K. (formerly Teikoku Sanso K.K.)

Liquefied helium is indispensable for maintaining superconductive state, as in linear-motor cars. It is also increasingly used for instruments (such as gas chromatography) and nuclear reactors, among others.

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SCIENCE AND TECHNOLOGY

NSC EXPECTS USE OF OIL-BASED FUEL WILL DECREASE

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 974, 29 Sep 81 p 6

[Text]

Nippon Steel Corp. expects its petroleum-based fuel consumption during the current fiscal year ending next March to drop 47.8 per cent from preceding fiscal year to around 821,000 kiloliters.

The current fiscal year's consumption volume is about one-sixth of that in fiscal 1973.

Japan's largest steelmaker ascribes such a sharp reduction in fuel oil consumption to its stepped up efforts to bring down the dependence on oil, such as oil-less blast furnace operations and increased use of coke oven gas.

NSC put all of its 16 blast furnaces into oil-less operations by the end of last May. As a result, output of by-product gases, such as coke oven gas, has increased greatly.

During fiscal 1980, ended last March, NSC consumed 1,574,000 kiloliters of petroleum-based fuels, down 33.5 per cent from the preceding fiscal year. The total broke down into 487,000 kiloliters of LPG and LNG, 43,000 kiloliters of kerosene and gas oil, 437,000 kiloliters of fuel oil for reheating and 607,000 kiloliters of fuel oil for high-pressure blasting.

NSC is now pushing ahead its second energy conservation program (fiscal 1979-1983) aimed at cutting its overall energy consumption by 10 per cent.

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SCIENCE AND TECHNOLOGY

BRITAIN'S 600 GROUP HOPES FOR ROBOT-MAKING TECHNOLOGY

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 974, 29 Sep 81 p 7

[Text] Fujitsu Fanuc Ltd. will start talks with the 600 Group Limited of London to provide industrial robot manufacturing know-how in line with Britain's recent call for Japan to extend technological cooperation.

Before negotiating with the London company, however, Fujitsu Fanuc will seek understanding of Siemens AG of Munich. The Japanese enterprise holds a general agency contract with the German electrical machinery maker on sales of industrial robots in Europe.

The 600 Group, Britain's biggest machine tool builder, has been selling Fujitsu Fanuc's robots there for three years under a marketing license granted by Siemens.

The British machine tool maker, anxious to manufacture robots on its own, asked Thatcher's aides to seek Japanese robot production expertise through government-to-government bargaining.

British Industry Department Deputy Secretary A.G. Manzie and Education & Science State Secretary Keith Joseph came to Japan recently and conveyed their wish to the Ministry of International Trade & Industry to work on Fujitsu Fanuc to conclude a technological tie with the 600 Group.

Joseph, former industry state secretary, and other British government officials, at a meeting with their Japanese counterparts in Tokyo on September 10 and 11, strongly pressed for cooperation over robots, electronics and communications equipment.

Joseph told ITI Minister Rokusuke Tanaka that the British Government finds it vitally important to improve the nation's productivity, thereby revitalizing domestic industries.

MITI appears ready to positively support the proposed link of Fujitsu Fanuc and the London company in an effort to mitigate mounting British outcry against Japan over the lopsided trade now favoring Japan.

Japan's trade with Britain scored a surplus of $1,830 million in 1980 and a surplus of $1,200 million in the January-July period of this year.

The Ministry of International Trade & Industry, eager to correct the trade imbalance with Britain and expand imports from the country, wants Japanese enterprises to cooperate with their British counterparts in "high technology" phases including computer-related software, business machines and optical fibers as well as robots, electronics and communications equipment.

In order to help Japanese enterprises facilitate granting technological aid to the Britons, MITI is ready to provide related data and information, act as an intermediary in tie-up arrangements, and offer subsidies or government-guaranteed loans.

Japan now owns 75,000 industrial robots — 80 per cent of the world's total. Its robot production has been increasing at an annual rate of more than 50 per cent, registering some 20,000 units or ¥78.5 billion.

The situation has driven U.S. and European enterprises to introduce Japanese robot-making technology. Hitachi, Ltd. has just tied up with General Electric Co. of the U.S. on robot production and marketing.

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SCIENCE AND TECHNOLOGY

MITI HOPES TO INCREASE OIL WELL YIELD

Tokvo JAPAN ECONOMIC JOURNAL in English Vol 19 No 974, 29 Sep 81 p 16

[Text]

Japan's studies on repeatedly tapping spent oil wells to boost crude oil yield will be launched next year by the Ministry of International Trade and Industry.

MITI reported it has decided to start a five-year joint government-industry project in fiscal 1982 (from April) to develop secondary and tertiary oil-drawing methods. They hope to boost oil well yield from only around 25 per cent of the total estimated pool hitherto attainable to twice or even three times as much. Conventional methods of drawing only an oil well's flow leaves underground the largest portion of the pool in sticky or harder form.

Development of methods to tap oil wells after they have reached the limit of flow is said to be already under intensive study in the U.S. with an effective method reportedly being applied on a commercial basis. Such methods are drawing sharp attention of many oil-producing nations for their importance in extending the productivity of oil resources.

MITI plans to have the governmental Japan National Oil Corp. and domestic oil and chemical companies undertake the proposed research project. They will share the total estimated cost of ¥20 billion in the proportion of 75 per cent for the corporation and 25 for industrial companies. Such companies will be asked to create a joint research-development association for the project.

The basic theoretical studies on which the project will be based are expected to be completed by the corporation and also the governmental Petroleum Development Technology Center by next March.

There have been many internationally known methods of such repeated tapping of a spent oil well, such as "(pressure) gas injection," "water-flooding," "fire-flooding" and "miscible drive." The last one is to pour liquefied petroleum gas or something like it into a used oil well to dissolve the remaining harder or stickier crude oil and push it out.

MITI is planning to develop two methods through the joint government-industry efforts. One is a thermal method to pump pressurized steam into the well for dissolution and outflow of the remaining crude, and the other is a chemical method to push foaming surfactant (surface active agent) or highly-polymerized chemical into the well for similar effects.

MITI envisions building a pair of test demonstration plants, one each in Niigata and Akita Prefectures (Japan's two oil-producing Japan Sea coastal regions), between 1983 and 1986. If things go well, the final tests before commercialization are scheduled thereafter at Middle East or South American oil fields where Japanese have obtained development concessions.

Such secondary or tertiary oil well tapping is said to be much more economical than coal liquefaction or oil shale or oil sand oil extraction methods, according to an estimate of Bechtel Corp. of the U.S. As the well-known engineering corporation has figured, the necessary per-day, per-barrel investment in the repeated tapping method will be only $28,000, compared with $72,000 for liquefaction of coal and ¥30,000 for oil shale cracking. Big-business U.S. oil companies thus have been developing their respective repeated tapping methods since 1976 under governmental subsidies of $25 million to $50 million a year.

Besides being inspired by American precedents, MITI sees the possibility of various oil-producing nations demanding repeated tapping capacity as necessary qualifications for foreign oil explorers to be granted development concessions.

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END